IN THE CLAIMS

Please cancel claims 17 and 35, and amend claims 1, 12, 18, 19, 21 and 30 as indicated below.

1. (Currently amended) In an optical fiber communications system, a method for maintaining jitter tolerance of data transmitted across the communications system, the method comprising:

receiving a tributary complying with a jitter tolerance;

recovering data from the tributary;

receiving a reference clock;

<u>retiming the recovered data according to the reference clock;</u>

converting the recovered data into at least two intermediate-speed data channels, wherein each intermediate-speed data channel is timed by a first clock based on the reference clock;

converting each intermediate-speed data channel into at least two low-speed data channels, wherein the low-speed data channels in aggregate contain the recovered data and each low-speed data channel is timed by a second clock based on the reference clock;

modulating each low-speed data channel to generate a corresponding low-speed symbol channel; and

frequency division multiplexing the low-speed symbol channels to produce an electrical high-speed channel for transmission in optical form across the communications system.

2. (Original): The method of claim 1 wherein the tributary and the jitter tolerance conform to a SONET protocol.

3. (Original) The method of claim 2 wherein each low-speed data channel includes:

a framing header and a data rate which conforms to the SONET protocol; and

a payload which does not conform to the SONET protocol.

4. (Original) The method of claim 3 wherein each low-speed data channel includes:

    a framing header and a data rate which conforms to the STS-3 protocol; and

    a payload which does not conform to the STS-3 protocol.

5. (Original) The method of claim 3 wherein each low-speed data channel includes:

    a framing header and a data rate which conforms to the STS-48 protocol; and

    a payload which does not conform to the STS-48 protocol.

6. (Previously presented) The method of claim 1 wherein the step of converting the recovered data into at least two intermediate-speed data channels comprises:

    recovering a clock from the tributary;

    phase aligning the reference clock to the recovered clock;

    retiming the recovered data using the phase-aligned reference clock; and

    time division demultiplexing the retimed, recovered data into the intermediate-speed data channels.

7. (Previously presented) The method of claim 6 wherein the step of converting each intermediate-speed data channel into at least two low-speed data channels comprises:

    dividing the phase-aligned reference clock to produce the first clock;

    retiming the recovered data in the intermediate-speed data channels using the first clock;

    time division demultiplexing the intermediate-speed data channels into the low-speed data channels.

8. (Previously presented) The method of claim 1 further comprising:

    converting the electrical high-speed channel to an optical high-speed channel;

    transmitting the optical high-speed channel across a fiber;

    receiving the optical high-speed channel;

    converting the received optical high-speed channel to a receive-side electrical high-speed channel;

frequency division demultiplexing the receive-side electrical high-speed channel into at least two receive-side low-speed symbol channels;

demodulating each receive-side low-speed symbol channel to generate a corresponding receive-side low-speed data channel;

recovering a clock and data from each receive-side low-speed data channel;

generating a receive-side reference clock synchronized to the receive-side recovered data;

converting the receive-side low-speed data channels into at least two receive-side intermediate-speed data channels; and

converting the receive-side intermediate-speed data channels into a receive-side tributary, wherein the receive-side tributary contains all of the receive-side recovered data, and the receive-side tributary is timed by a clock based on the receive-side reference clock and complies with the jitter tolerance.

9. (Original) The method of claim 8 wherein the tributary, the receive-side tributary and the jitter tolerance conform to a SONET protocol.

10. (Previously presented) The method of claim 8 wherein the step of converting the receive-side low-speed data channels into at least two receive-side intermediate-speed data channels comprises:

storing the recovered data from each receive-side low-speed data channel;

aligning a timing for the receive-side low-speed data channels; and

time division multiplexing the receive-side recovered data from the receive-side low-speed data channels into the at least two receive-side intermediate-speed data channels according to the aligned timing.

11. (Previously presented) The method of claim 10 wherein the step of converting the receive-side intermediate-speed data channels into the tributary comprises:

storing the recovered data from each receive-side intermediate-speed data channel;

aligning a timing for the receive-side intermediate-speed data channels; and

time division multiplexing the stored recovered data from the receive-side intermediate-speed data channels according to the aligned timing.

12. (Currently Amended) In an optical fiber communications system, a method for maintaining jitter tolerance of data transmitted across the communications system, the method comprising:

receiving an optical high-speed channel containing data transmitted across the communications system, the data from a tributary complying with a jitter tolerance before said transmission;

frequency division demultiplexing an electrical high-speed channel into at least two low-speed symbol channels, wherein the electrical high-speed channel is derived from the optical high-speed channel;

demodulating each low-speed symbol channel to generate a corresponding low-speed data channel;

recovering data from each low-speed data channel;

generating a reference clock synchronized to the recovered data; ~~and~~

~~converting the low-speed data channels into at least two intermediate-speed data channels~~

<u>storing the recovered data from each low-speed data channel;</u>

<u>aligning a timing for the low-speed data channels;</u>

<u>time division multiplexing the recovered data from the low-speed data channels into at least two intermediate-speed data channels according to the aligned timing;</u>

<u>aligning a timing for the intermediate-speed data channels;</u> and

converting the intermediate-speed data channels into a tributary, wherein the tributary contains all of the recovered data, and the tributary is timed by a clock based on the reference clock and complies with the jitter tolerance.

13. (Original) The method of claim 12 wherein the tributary and the jitter tolerance conform to a SONET protocol.

14. (Original) The method of claim 13 wherein each low-speed data channel includes:
    a framing header and a data rate which conforms to the SONET protocol; and
    a payload which does not conform to the SONET protocol.

15. (Original) The method of claim 14 wherein each low-speed data channel includes:
    a framing header and a data rate which conforms to the STS-3 protocol; and
    a payload which does not conform to the STS-3 protocol.

16. (Original) The method of claim 14 wherein each low-speed data channel includes:
    a framing header and a data rate which conforms to the STS-48 protocol; and
    a payload which does not conform to the STS-48 protocol.

17. (Cancelled)

18. (Currently Amended) The method of claim [[17]] 12 wherein the step of aligning a timing for the low-speed data channels comprises:
    generating a framing pulse for each low-speed data channel; and
    aligning the framing pulses.

19. (Currently Amended) The method of claim [[17]] 12 wherein the step of converting the intermediate-speed data channels into the tributary comprises:
    storing the recovered data from each intermediate-speed data channel;
    aligning a timing for the intermediate-speed data channels; and
    time division multiplexing the stored recovered data from the intermediate-speed data channels according to the aligned timing.

20. (Previously presented) The method of claim 19 wherein the step of aligning a timing for the intermediate-speed data channels comprises:
    generating a framing pulse for each intermediate-speed data channel; and
    aligning the framing pulses.

21. (Currently Amended) An optical fiber communications system for maintaining jitter tolerance of data transmitted across the communications system, the communications system comprising:

a local oscillator for generating a reference clock conforming to a jitter tolerance;

a clock and data recovery circuitry coupled to the local oscillator for recovering data from a received tributary and for retiming the recovered data according to the reference clock;

a first time division demultiplexer coupled to the clock and data recovery circuitry for time division demultiplexing the recovered data into at least two intermediate-speed data channels, wherein each intermediate-speed data channel is timed by a first clock based on the reference clock;

a second time division demultiplexer coupled to the clock and data recovery circuitry for time division demultiplexing the ~~recovered data~~ intermediate-speed data channels into at least two low-speed data channels, wherein each low-speed data channel is timed by a second clock based on the reference clock;

a modulator coupled to the time division demultiplexer for modulating each low-speed data channel to generate a corresponding low-speed symbol channel; and

a frequency division multiplexer coupled to the modulator for frequency division multiplexing the low-speed symbol channels to produce an electrical high-speed channel for transmission in optical form across the communications system.

22. (Original) The communications system of claim 21 wherein the tributary and the jitter tolerance conform to a SONET protocol.

23. (Original) The communications system of claim 22 wherein each low-speed data channel includes:

a framing header and a data rate which conforms to the SONET protocol; and

a payload which does not conform to the SONET protocol.

24. (Original) The communications system of claim 23 wherein each low-speed data channel includes:

a framing header and a data rate which conforms to the STS-3 protocol; and

a payload which does not conform to the STS-3 protocol.

25. (Original) The communications system of claim 23 wherein each low-speed data channel includes:

a framing header and a data rate which conforms to the STS-48 protocol; and

a payload which does not conform to the STS-48 protocol.

26. (Cancelled)

27. (Previously presented) The communications system of claim 21 further comprising:

an E/O converter coupled to the frequency division multiplexer for converting the electrical high-speed channel to an optical high-speed channel and for transmitting the optical high-speed channel across a fiber;

an O/E converter for receiving the optical high-speed channel and for converting the received optical high-speed channel to a receive-side electrical high-speed channel;

a frequency division demultiplexer coupled to the O/E converter for frequency division demultiplexing the receive-side electrical high-speed channel into at least two receive-side low-speed symbol channels;

a demodulator coupled to the frequency division demultiplexer for demodulating each receive-side low-speed symbol channel to generate a corresponding receive-side low-speed data channel;

a receive-side data recovery circuitry coupled to the demodulator for recovering data from each receive-side low-speed data channel;

a phase-locked loop coupled to the receive-side data recovery circuitry for generating a receive-side reference clock synchronized to the receive-side recovered data; and

a first time division multiplexer coupled to the receive-side data recovery circuitry and the phase-locked loop for generating at least two intermediate-speed data channels; and

a second time division multiplexer coupled to the first time division multiplexer for generating a receive-side tributary, wherein the receive-side tributary contains all of the receive-side recovered data, and the receive-side tributary is timed by a clock based on the receive-side reference clock and complies with the jitter tolerance.

28. (Original) The communications system of claim 27 wherein the tributary, the receive-side tributary and the jitter tolerance conform to a SONET protocol.

29. (Previously presented) The communications system of claim 27

wherein the first time-division multiplexer comprises:

a state machine for aligning a timing for the receive-side intermediate-speed data channels;

buffers for storing the recovered data from each receive-side intermediate -speed data channel and releasing the stored recovered data according to the aligned timing; and

multiplexers for combining the released data; and

wherein the second time-division multiplexer comprises:

a state machine for aligning a timing for the receive-side low-speed data channels;

buffers for storing the recovered data from each receive-side low-speed data channel and releasing the stored recovered data according to the aligned timing; and

multiplexers for combining the released data.

30. (Currently Amended) An optical fiber communications system for maintaining jitter tolerance of data transmitted across the communications system, the communications system comprising:

a receiver for receiving an optical high-speed channel containing data transmitted across the communications system, the data from a tributary complying with a jitter tolerance before said transmission;

a frequency division demultiplexer coupled to the receiver for frequency division demultiplexing an electrical high-speed channel into at least two low-speed symbol channels, wherein the electrical high-speed channel is derived from the optical high-speed channel;

a demodulator coupled to the frequency division demultiplexer for demodulating each low-speed symbol channel to generate a corresponding low-speed data channel;

a clock and data recovery circuitry coupled to the demodulator for recovering data from each low-speed data channel and for generating a reference clock synchronized to the recovered data; and

a first time division multiplexer coupled to the clock and data recovery circuitry for generating at least two intermediate-speed data channels, wherein the first time division multiplexer comprises:

circuitry for aligning a timing according to the reference clock for the receive-side low-speed data channels;

circuitry for storing the recovered data from each receive-side low-speed data channel, and for releasing stored recovered data from the low-speed data channels according to the aligned timing; and

circuitry for combining the released data from the low-speed data channels;

wherein the intermediate-speed data channels are timed by a first clock based on the reference clock and comply with the jitter tolerance; and

a second time division multiplexer coupled to the clock and data recovery circuitry for generating a tributary, wherein the tributary contains all of the recovered data, and the tributary is timed by a second clock based on the reference clock and complies with the jitter tolerance.

31. (Original) The communications system of claim 30 wherein the tributary and the jitter tolerance conform to a SONET protocol.

32. (Original) The communications system of claim 31 wherein each low-speed data channel includes:

a framing header and a data rate which conforms to the SONET protocol; and
a payload which does not conform to the SONET protocol.

33. (Original) The communications system of claim 32 wherein each low-speed data channel includes:

a framing header and a data rate which conforms to the STS-3 protocol; and
a payload which does not conform to the STS-3 protocol.

34. (Original) The communications system of claim 32 wherein each low-speed data channel includes:

a framing header and a data rate which conforms to the STS-48 protocol; and
a payload which does not conform to the STS-48 protocol.

35. (Cancelled)

36. (Previously presented) The communications system of claim 30 wherein the second time division multiplexer comprises:

a state machine for aligning a timing for the receive-side intermediate-speed data channels;
buffers for storing the recovered data from each receive-side intermediate-speed data channel and releasing the stored recovered data from the intermediate-speed data channels according to the aligned timing; and
multiplexers for combining the released data from the intermediate-speed data channels.